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ORGANIZATIONAL NEEDS OF THE CONSTRUCTION
SECTOR IN THE PROVISION OF PRODUCTIVE
AND
SUPPORT SERVICES IN RURAL AREAS

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I. INTRODUCTION

1. The construction industry is the primary agent for the production of the physical, economic and social infrastructural facilities on which national economic development depends. In the rural areas, the roads, dams, irrigation canals, buildings for agro-based industries and storage facilities, all of which are necessary for the development of the agricultural sector, as well as the provision of shelter, schools, clinics and other community facilities, are all produced by this industry.

2. In spite of its key role in the promotion of economic development in both the urban and rural areas, the construction sector is characterized by low capacity and inefficiency caused by a number of factors which are well documented. 1/ Prominent among these are the frequent shortages of building materials; overdependence on imported inputs - materials, equipment, skills; low productivity resulting, inter-alia, from inadequately trained craftsmen, poor supervision and management practices, use of obsolete plant and equipment and poor maintenance practices.

3. About 70 per cent of the population in Africa live in the rural areas. In some countries like Ethiopia and Malawi, it is 90 per cent. The rural economy in African countries is basically agricultural and generates the primary export crops, which in most countries constitute a significant proportion of foreign exchange earnings. It also produces the bulk of the food crops consumed in the urban areas. It is often claimed that the rural areas produce much of the national wealth which, in turn, is used to develop infrastructures and provides a relatively high quality of life to the one-third of the population living in the urban areas.

4. The sharp contrasts in infrastructure provision between urban and rural areas in Africa is well known. The road network in rural areas is poorly developed and for many rural communities, accessibility to markets and service centres is problematic. Accessibility to social services like health and education is generally poor. Shelter is constructed in unimproved local materials with low durability and for many settlements, a basic amenity like latrines is virtually non-existent.

5. There is however increasing concern, globally and indeed in African countries, over the plight of the rural communities. The programme of action of the World Conference on agrarian reform and rural development called on governments, in their strategies to develop non-agricultural activities in rural areas, to consider, inter-alia, action to allocate to rural areas a greater share of public utility and other infrastructure, particularly health services and education, water, power, roads transport and communication. 2/ More recently, the African Priority Programme for Economic Recovery (1986-1990) focused attention on the improvement of rural infrastructures concerning mainly "feeder roads, storage facilities, irrigation facilities, and rural amenities and services such as rural health, education, water supply and information".

6. This renewed emphasis on the development of rural infrastructures and services will result, increasingly, in projects that the construction sector will be called upon to undertake. There is therefore the need to review the problems facing the sector, particularly in respect of its organization and operations in rural areas in order to meet the challenges of increased projects in such areas.

7. Chapter II of the document assesses the need for the provision of infrastructures which are required for productive and support services in the rural areas and discusses the appropriateness of current design concepts to rural projects. Chapter III discusses the role of the construction sector in the creation of these infrastructures and reviews the problems of construction in the rural areas. In the light of the foregoing, chapter IV outlines aspects of an approach to the organization of the construction sector for more efficient project implementation in rural areas. Finally, chapter V outlines the responsibilities of African governments, regional and international organizations in enhancing the successful application of this approach.

II. PROVISION OF PRODUCTIVE AND SUPPORTIVE SERVICES IN RURAL AREAS - the need

The need for productive and support services in rural areas

8. Since the rural economy in African countries is predominantly based on agriculture rural development strategies have very often focused on measures for modernization of agriculture and increased agricultural output. Other concepts of rural development find their bases in rural industrialization or the development of basic economic and social infrastructure. Irrespective of the emphasis in rural development philosophies, the provision of economic and social infrastructure constitutes a key link in the development process. For example the World Conference on Agrarian Reform and Rural Development observed that a vital and integral part of rural development was the promotion of non-farm activities which provided new employment and created necessary social and technical infrastructure and helped to reduce both rural exodus and growth of urban slums. 3/

9. It is generally accepted that road construction is one of the key catalysts for inducing rural development, together with among other things, the provision of water, health and educational services. Investments in road construction have led to increased agricultural production, resulting from reduced transport costs, access to markets and to cheaper agricultural inputs. 4/ Better roads increase frequency of visits by health workers and improve access to medical facilities in neighbouring towns. A study of the impact of rural penetration roads in Sierra Leone concluded that

"the roads have led to more frequent extension agent visits, increased traffic and transport services, high quality cement construction, more purchase of consumer goods and more health services in villages served by the roads. In addition, there are indications that ... the roads have played some role in facilitating fertilizer use; in bringing about wider cultivation and marketing of cash crops; expanding commercial activity and in increasing educational opportunities". 5/

10. In spite of their role in promoting rural development, the rural road networks, particularly the feeder and access roads, are poorly developed in African countries. One consequence of this is that rural dwellers have limited access to passenger transport facilities. A survey in Kenya, for example, revealed that over 90 per cent of trips were on foot, 4 per cent by bicycle, 2 per cent by paratransit services and only 0.5 per cent by bus. 6/ Poorly developed feeder road networks also affect food and cash crop production because of difficulties in moving the produce to market centres. Other negative impacts include poor access to social services such as health and education.

11. In addition to the deficiencies in the provision of roads, there are also great needs in the provision of social infrastructure. For example, WHO has estimated that in the rural areas of some Sahelian countries only between 5 per cent and 15 per cent of the population have access to drinking water and less than 5 per cent have access to any form of excreta disposal facilities. 7/ In 1983, about 29 per cent of the rural population in East Africa had access to safe drinking water and the sanitation coverage was about 18 per cent on the average. 8/ In Ethiopia only 7 per cent had access to protected water, 10 per cent to latrines and 3 per cent to refuse disposal facilities. 9/

12. The backlog, as well as current needs for the provision of health and educational facilities is also great in African countries. And these are essential for the achievement of an improved quality of life for the rural population.

13. Programmes for the improvement of rural conditions have been receiving increasing attention and already, in a number of countries special ministries or departments responsible for rural development have been set up. Measures for improved agricultural output through increased production and reduction of post-harvest losses call for infrastructures such as irrigation facilities and storage facilities (silos, sheds, etc.) Agricultural resettlement schemes will call for the provision of shelter and other community facilities. The promotion of agro-based industries is of priority concern in African countries. Improvement of feeder road networks also features in rural development programmes. The creation of all these infrastructures is ultimately the responsibility of the construction industry.

The development of economic and social infrastructure in urban and rural-areas

14. There is clearly an imbalance in the distribution of infrastructural facilities between the urban and rural areas in Africa which can also be found in other developing regions of the world. While there are good reasons for large investments in urban infrastructure, this prevailing situation in which the rural areas are poorly served is a major contributor to the rural-urban population shift.

15. There is a high concentration of population in the urban areas and particularly in capital cities. In 10 African countries (Angola, Benin, Guinea, Kenya, Libya, Mozambique, Senegal, Tanzania, Togo and Uganda) more than half and up to 83 per cent of their urban population are concentrated in the largest city. In thirteen other countries at least one-third of the population live in a single city. 10/ Much of the production of goods and services is also concentrated in the urban areas. It is estimated that in the majority of African countries, more than 65 per cent of total national production can be attributed to urban areas. 11/

16. A large network of facilities - roads, water supply, drainage, electricity, schools, hospitals, etc. is required to support the large population concentrations and economic activities. As the population increases and the level of service provided by the existing infrastructure deteriorates, there is pressure to make further investments. Slums and squatter settlements develop and upgrading programmes involving the improvement of shelter and the provision of access roads, water, latrines, etc. are initiated (for example, site and services schemes).

17. Problems relating to infrastructure in urban areas, and especially the capital cities, tend to naturally receive the priority attention of governments because of their strong political base and the existence of strong interest and pressure groups. The problems are also conspicuous to policy and decision-makers who are themselves affected by the overcrowding on the streets, poor street lighting, insanitary conditions, etc.

18. Investments in social and economic infrastructure in the rural areas of Africa have not been commensurate with the needs. And the needs are great, as outlined in the preceding section. The renewal of commitment by African governments to the development of rural areas should lead to a gradual redressing of the imbalance that has characterized the provision of infrastructures viz-a-viz the urban areas.

Appropriateness of design concepts to rural areas

19. Present designs for projects in rural areas do not often take account of the peculiar situation and circumstances of such areas with the result that the infrastructure components of rural development projects have relied on standard equipment-intensive technologies even when concern for rural unemployment would have made the use of labour-intensive technologies more appropriate. 12/

20. This continued conservatism in design may be attributed to a number of factors, including the following:

- (i) lack of information on, and training in innovations in construction techniques with emphasis on locally available inputs;
- (ii) tendency to view as backward, designs which rely on labour-intensive construction techniques;

- (iii) lack of local initiatives in research adaptation of proven experiences in other developing countries concerning innovative construction materials and techniques;
- (iv) shortage/absence of personnel or contractors capable of undertaking constructions based on innovative designs, for example, with emphasis on labour intensive techniques.

21. As will be shown in the next chapter, the rural areas of Africa are disadvantaged in the implementation of construction projects because of shortages of conventional materials and skilled workers, and poor access to construction equipment as well as equipment repair facilities. In this context therefore, it appears logical to advocate for a rationalization in design principles to ensure better success in implementation.

22. It is important, however, to be aware of the consequences of the application of new technologies in the construction process in order to avoid difficulties at the implementation stage. For example, in the implementation of the Kenyan rural access roads programme which was based on labour intensive techniques, the following initial problems were identified: 13/

- supervisors were not trained to organize labour;
- payment systems could not accommodate large groups of casual labour;
- procurement systems were not adapted to the purchase of good quality hand tools; and
- no productivity data existed on the output of labour.

23. However these problems were overcome with time after the necessary measures had been taken and experience from the project has shown that "Labourbased techniques could be used on a large scale for the building of roads, that they could achieve a good standard, that they were inexpensive and that overall output could be maintained at a reasonably high level". 14/

24. The adoption of innovative designs, when appropriate, is therefore not only logical from the point of view of optimizing the use of locally available inputs and depending less on imported items, but it could also lead to a lowering of construction costs, and increase non-farm employment opportunities in the rural areas.

III. THE CONSTRUCTION SECTOR AND THE CREATION OF PRODUCTIVE AND SUPPORT SERVICES

25. The rural economy in African countries is based primarily on agriculture and therefore the development of agricultural penetration or feeder roads, irrigation systems, farm structures and storage facilities constitute an essential component of rural development programmes. The provision of social facilities such as schools, health centres and clinics, and community centres is also accorded high priority.

26. All these infrastructures and facilities are created by the construction sector. The performance of this sector in rural areas is however affected by a number of factors which are related to inherent problems of the sector itself and also to the peculiar conditions in rural areas. Some of these factors are discussed in the following sections.

(a) Organization of project planning and implementation

27. The principal actors in the planning and implementation of projects are the employer (client), the designer (engineer or architect), the quantity surveyor, other consultants (for both design and supervision), and the contractor. There are established models for project preparation and appraisal, tendering and award of contract, and supervision which vary among African countries depending on past colonial links. However, the principal actors remain the same. The actors in between the client and the contractor may or may not belong to the same firm or consulting group.

28. The contractor usually comes into the picture at the tender stage and therefore exercises little influence on the design specifications which have definite consequences on the building materials and construction techniques to be utilized. A system for involving the contractors at the design stage could have distinct advantages for successful project implementation. The contractor would have the opportunity to make available to the design team his knowledge of alternative materials and methods of construction to guide the selection of those that are appropriate to the project on hand. His accumulated experience would also be useful in developing and defining detailed plans and specifications. These considerations would be most beneficial to projects in rural areas where problems in obtaining conventional building materials, equipment and skilled labour are magnified several times.

29. Organization of the planning and implementation of projects often takes place at different levels in a country. Firstly, there are projects planned at the national level by a ministry either directly or through a parastatal under the ministry, for example, roads and bridges, dams, water supply schemes, irrigation schemes, etc. The design for these projects, is generally carried out at the head office of the ministry based in the capital. For minor projects, however, designs could be carried out at the regional (sub-national) office of the concerned agency, if the requisite expertise is available. Supervision of the projects is organized directly by the head office or may be undertaken by the regional office with occasional visits by head office staff.

30. A second category of projects comprises those initiated at the regional (sub-national) level either by the regional administrative office or by regional branches of infrastructural development agencies. Responsibility for the design of such projects would normally be assumed by the concerned regional branch office, but depending on the level of decentralization practised in the country, the designs would have to be approved by the head office. The award of contract and project supervision would normally be carried out by the concerned regional office. To forestall abuses of established procedures, contract awards and payments to contractors are supervised by a regional tender board.

31. The third category of projects involves those which come under the ambit of district/local councils or authorities. These would include projects like construction of market stalls, small community buildings (post office, community centre, public latrine, etc.) storage sheds for farm produce, etc. In some countries, the major infrastructure agencies responsible for roads, water supply, electrical power supply, public works, etc. maintain offices at the district level and their staff provide technical services to the district council. Capacities may therefore exist at this level for the design of projects as well as their supervision. Otherwise assistance would be sought from the regional office.

32. Parastatals which act as consultants to the government for organizing the design and supervision of certain categories of construction projects having a specified minimum value have been established in some countries. Government agencies are permitted, under this arrangement, to assume responsibility for the design and supervision of only projects of values below the specified minimum. In other countries the public works ministry or department provides consultancy services to the government for construction projects.

33. For all the categories of project planning and implementation cited above, there is a tendency in many countries for overcentralization of contract administration with the result that payments for completed works, even when processed at the district or regional level, are effected at the national capital. This is due partly to the shortage of funds in the national treasury which means that funds may not be available at a specific time though a project has been provided for in the national budgetary allocations. Even though some contracts carry penalty clauses for delayed payments by the client, contractors are often reluctant to evoke such clauses probably for fear of victimization in future contract awards. For a small contractor operating in the rural area, the complex administrative procedures and the concomitant payment delays exert serious consequences on his activities to the extent that he may just manage to break-even on a number of projects, or may have to abandon some projects which in the end affects his performance record.

34. While problems faced by the small-scale contractor are not unique to him, being the result of an established structure which needs review, some discriminatory measures may be worth considering, not only to help build up this category of contractors, but also to enhance the successful implementation of infrastructural and social services projects in the rural areas. Some of the measures which could be considered for application in African countries are discussed in chapter IV.

(b) Assessment of construction capacity

35. The availability of an adequate number of construction firms with the requisite capital base, equipment, skills and experience to undertake planned construction projects is crucial for successful project implementation. With respect to projects located in rural areas, there is an additional requirement: the willingness of construction firms operating mainly in cities and large towns to accept to undertake them.

36. The failure to implement development projects in many countries has been attributed by governments, to inadequate capacity in the construction sector.

Size and nature of construction firms

37. The majority, more than 50 per cent, of locally registered contractors may be classified as small size firms with capacity to undertake minor construction projects. For example in 1983, 65 per cent of registered contractors in Tanzania were classified as small firms. These firms had, on the average, a turnover of Tsh 1.5 million, with a staff of 50 including four professionals and equipment comprising one tipper, one pick-up, one mixer and one block making machine. On the other hand, contractors classified in the highest category, with capacity to undertake very major projects, constituted only 9 per cent of the total. They had an average turnover of Tsh 25 million and around 600 staff including five engineers and 20 other professionals and foremen. 15/

38. Because of the small number of highly qualified contractors, there is a tendency often to have some of them handling more projects than their available resources would permit them to cope with efficiently. Another consequence of this situation is that for larger contracts the few qualified firms command high prices, a phenomenon which has contributed to high annual increases in prices.

39. As a result of their limited expertise and equipment holdings even the large scale local construction firms are often not able to cope with the requirements of major projects including dams, large irrigation schemes, roads and complex structures. Contracts for such projects are therefore often won by foreign firms, sometimes in partnership with local firms.

40. Small construction enterprises are usually more adversely affected by the problems which are generally faced by contractors. For example, the ILO study cited above found that smaller contractors reported major financial problems twice as often as the larger contractors. In fact the smaller contractors were found to be more strongly disadvantaged when the proportion of credit they were allocated was compared with their proportionate contribution and total construction turnover. In proportion to turnover, small and medium-scale contractors received about three and half times less credit than larger contractors. The study concluded that unless moderate amounts of both foreign exchange and credit could be made available for the renewal of equipment, particularly for small and medium-scale contractors, there was a risk that overall capacity of the local construction sector could fall excessively in succeeding years.

41. Small contractors tend to be more labour-intensive than their larger counterparts and are therefore more amenable to the use of intermediate technologies, as has been suggested previously, for adoption in rural projects. In fact, even though statistics are not available, experience in many African countries would tend to show that small contractors are more attracted to rural-based projects than other contractors, probably because of: the size of the projects, difficulties in competing for jobs in urban areas, and the tendency of the larger contractors to concentrate their limited resources on projects in urban areas. The development of local construction capacity as a means of enhancing project implementation in rural areas should therefore focus more on the small-scale contractors.

Location of construction firms

42. Most construction firms are based in the cities and large towns with the capital usually accounting for a disproportionately high percentage. Again, using information on the construction industry in Tanzania, it was found that in 1983, about 54 per cent of all registered contractors had their base in the capital, Dar-es-Salaam. In the higher category of class 1 or class 2 contractors, as many as 70 per cent were based at the capital. Even though data from other countries are not available the situation is not likely to be significantly different from the picture portrayed above.

43. Thus outside the capital city there are fewer construction firms, predominantly in the small- to medium-scale categories. Contractors tend to have greater interest in tendering for projects in the regional capitals and other large towns than in rural locations far away from the urban centres. The several problems relating to building materials, equipment maintenance and skilled labour force are magnified in the rural context and small contracts involving, for example, the construction of school blocks and clinics are often taken up by small firms which are unable to win contracts in urban areas and are willing to utilize such jobs to build up their experience and capital. Projects for the construction of feeder roads and small agricultural settlements schemes are also likely to interest only contractors in the small- to medium-scale categories.

44. Apart from district centres where some small contractors may be headquartered, it would generally be difficult to find any such contractors in the typical rural area, purely because of economic considerations. It is possible however to find a few skilled workers like carpenters or masons who operate on parttime basis, sharing their time between farming activities and housing construction.

(c) Problems of project implementation in rural areas

45. The implementation of construction projects for the provision of infrastructural and service facilities in rural areas poses special problems for contractors who are based mainly in the cities and major towns in the countries of the region. These problems, including those discussed below, explain to a large extent, the reluctance of many contracting firms to undertake projects in rural locations. A careful analysis of the problems is however necessary if suitable measures are to be developed and implemented to ensure that projects aimed at promoting economic development and generally improving living conditions in rural areas, can be undertaken without undue hindrance.

Shortage of conventional building materials

46. This is a common problem in the construction sector as a whole in most African countries but assumes even more serious proportions in a rural context given the characteristics of building materials supply. In many countries, materials such as ordinary portland cement, steel and metal roofing sheets are imported and thus their supply is determined largely by the foreign exchange

position of the country. Even for materials which are produced locally either from imported inputs or essentially locally available raw materials, experience shows that production is concentrated in a few locations close to the large population centres which provide the biggest markets for the products of the plants. Because of poor transportation networks the normal distribution system for building materials favours the large centres which are usually more accessible and account for the highest proportion of the important building and civil works.

47. In order to introduce rationality into the distribution system and ensure equity and judicious use of scarce building materials, some countries have set up institutional arrangements for this purpose. For example in Tanzania, the Building Hardware and Electrical Supplies Company (BHESCO) was established by the Government in 1973, among other things to

- (i) handle the importation of goods that will be confined to it by the government from time to time, and
- (ii) distribute the goods thus imported equitably taking into consideration the relevant elements pertaining in each region (sub-national).

BHESCO distributes the imported materials essentially under three main categories:

- (i) percentages have been established for each Regional Trading Company to cater for regionally financed projects, and also for individuals;
 - (ii) a portion of the materials is earmarked for contractors undertaking national projects all over the country;
 - (iii) the third category of allocation serves government departments, parastatals, diplomatic missions and large manufacturing firms.
- 16/

48. Theoretically, such practical distribution arrangements should help to ensure that projects in the rural areas receive a fair share of the available building materials. Experience in many countries, however, points to the contrary. Apart from the transportation problems referred to above, there is also a problem of ensuring that diversion does not occur and that materials allocated to specific projects in the rural area get to the construction sites. Contractors are usually keen on devoting more attention to the timely completion of projects in the cities and other urban areas and are therefore likely, in a situation of insufficient supplies, to divert their building materials allocations to such projects.

49. A small contractor operating in the rural area has to contend with another problem related to building materials supply. Because of chronic shortages of materials, a black market often develops and some big construction firms supplement their official allocations with purchases from the black market to ensure continuity of work at their sites so as to minimize idling time of the labour force. The small contractor however lacks the capital to buy from the unofficial sources where prices could be more than twice the official price.

Shortage of skilled personnel

50. Construction is basically a labour-intensive activity, and labour constitutes the second largest single component of resources required by the construction industry, after building materials. The industry thus tends to attract a large proportion of unskilled labour, including temporary and seasonal labour. In spite of the abundance of manpower resources in African countries skilled and professional labour in the construction sector is very scarce and in some countries construction labour has to be imported.

51. Two main factors account for the shortage of skilled labour: the absence of, or inadequacy of training programmes and poor remuneration. Many countries have vocational training institutes to train carpenters, masons, painters, plumbers, steel benders, electricians, etc. but their output does not match the needs. For example, in 1981 valid application forms were received from 15,072 candidates for entry into the five training centres under the National Vocational Training Division in Tanzania, while there were only 1,412 places available. 17/

52. The system of apprenticeship which operates in the informal sector is another source of supply of artisans to the construction industry. This system, which is founded on the principle of on-the-job training, is generally unstructured and the period of training required to achieve a basic level of proficiency depends on the trainee's abilities and motivation. Figures on the proportion of skilled construction labour trained through this informal system are not readily available but the indication is that in some African countries it is significant.

53. Because of poor remuneration a number of skilled labour are lost to other countries, industries or firms. In fact local contractors sometimes lose most of their skilled labour to foreign contractors operating in the countries because of better salaries and incentives paid by the latter. The cyclical nature of jobs in the construction industry and the relatively low wages also combine to create a situation where some skilled workers opt for self-employment. For many, this form of employment is very rewarding when there is a lot of private construction activity, especially in the informal sector.

54. With the constant rural-urban migration caused, in part, by fewer job opportunities in the rural areas, the shortage of skilled labour is more acute than in urban areas. Artisans who acquire training through the informal sector drift to the urban areas in search of better opportunities. Contractors are therefore often obliged to attract such labour from the urban areas to projects in the rural areas. This may necessitate the payment of special incentive allowances and the search for accommodation in nearby villages or alternatively, the provision of camping facilities. For the contractor who is unable to anticipate such a situation and the associated additional costs so that they would be reflected in the contract sum, this expenditure will constitute a loss.

Unavailability of equipment and parts

55. Next to the shortage of building materials, the unavailability of equipment and spare parts constitutes the second major problem faced by contractors in many African countries. The foreign exchange shortage experienced by the

countries makes it difficult to purchase new plant, equipment and vehicles. Difficulties in obtaining much needed spare parts often leads to cannibalization of some equipment in order to maintain others in good operating condition. The problem is worse for the smaller contractors who usually have a weak capital base and have poorer access to credit than the larger construction firms.

56. With the exception of the large firms which would have basic equipment, albeit aged and of low productivity, most of the contractors which would be attracted to projects in the rural areas have very few equipment of their own and therefore depend on plant hire services for their needs.

57. Due to the age and serviceability of most of the equipment available for hire, frequent breakdowns are experienced which in a rural area presents serious problems to the contractor. The nearest repair facilities or expertise may be several kilometres away, while the required spare part, if available in the country, may be found only in the capital city. Returning broken down equipment into service may therefore take several days.

58. Shortage of serviceable equipment and the absence of repair services therefore constitute a serious problem to small- to medium-scale contractors who operate in the rural areas. This problem combined with the frequent shortages in the supply of essential building materials underlie the reluctance of contractors to show enthusiasm for projects in rural areas.

Infrequent visits by officers of implementing agency

59. Supervision of construction projects by the implementing agency (client) or a consultant acting on its behalf, is important for a number of reasons. Firstly, it helps to ensure that the contractor complies with the design drawings and specification for materials and components, and that adequate quality control procedures are being applied on site. Secondly, questions arise during construction about design details and specifications which require clarification to enable the contractor to proceed. Sometimes in the light of specific site conditions which could not be foreseen at the project preparation stage there is need to effect changes in the design. For very important projects several decisions on the design and techniques adopted by the contractor are taken throughout the duration of the project. Frequent interaction between the contractor and technical representatives of the client is therefore an essential ingredient for successful project implementation.

60. For major projects of high value, both in the urban and rural areas, the client is often represented on site by a resident consultant. However, for small projects supervision is carried out by non-resident professionals who are responsible for several projects and other duties concurrently. Some projects in rural areas are therefore visited only occasionally at the time when measurement of work done is undertaken to prepare payment certificates. Under such circumstances, the contractor is obliged to use his discretion if he has sufficient technical knowledge, in the interpretation of design specifications, or to travel to the offices of the implementation agency in the district or regional capital for consultations.

61. Another aspect of this situation which confronts contractors executing projects in rural areas is that it can take a long time to have an officer from the implementing agency to come to the site for valuation of completed works. The resultant delays in payments, which are exacerbated by cumbersome administrative procedures have a negative effect on the contractor's cash flow position and finally lead to extended contract periods and cost over-runs.

IV. AN APPROACH TO THE ORGANIZATION OF THE CONSTRUCTION SECTOR FOR PROJECT IMPLEMENTATION IN RURAL AREAS

62. The discussions in the foregoing chapter have highlighted the existing deficiencies in the construction sector in African countries which culminate in problems of project implementation, especially in the rural areas. Lack of financial resources, both foreign and local, constitutes a major bottleneck to the achievement of high performance in the sector. Other problems faced by the sector are however mainly related to its present organization which favours the activities of large construction firms to the detriment of the smaller ones which are more disposed to accepting projects in the rural areas. Some of the issues concerning the creation of a conducive environment for improving the delivery of construction output in the rural areas are outlined below.

Provision of incentives to contractors for projects in rural areas

63. A number of factors, as outlined above in chapter III, sometimes make it unattractive for many contractors, to undertake construction projects in rural areas. Of course, in a situation where there are fewer jobs on the market than the available capacity, some contractors would be forced by circumstances to accept such projects. But even in such cases, project implementation would not be made any easier if the inhibiting factors continue to operate.

64. While it is obvious that the problems of project implementation in rural areas in a broader sense reflect the situation in the construction industry as a whole, there is need to minimize them in order to ensure the early completion of projects which have the objective of helping to improve the living conditions of the majority of the population who are deprived of many basic amenities and therefore live in abject poverty. Among the measures that could be taken to encourage contractors to operate in rural areas are the following:

- (i) ensure an adequate supply of essential building materials to rural projects; this may mean using discriminatory practices in the materials distribution system;
- (ii) facilitate the processing of claims and early payment for completed works;
- (iii) give priority in the award of contracts for rural projects to contractors based at district centres;
- (iv) for rural projects with external financing, make provision for the supply of basic construction equipment to participating contractors;

- (v) organize training for contractors in new techniques for rural projects, for example, the use of labour-intensive techniques in road construction, within the framework of the project implementation process. This (and also iv) has been done in some rural road improvement projects funded by the World Bank.

Development of decentralized construction capacity

65. In tandem with efforts to create incentives so as to make it attractive for urban-based contractors to accept jobs in rural areas, attempts should also be directed at creating decentralized construction capacity at the district and local levels.

66. The concept of decentralization of political administration as well as regional development planning is gradually gaining acceptance in some countries of the region. Promotion of the development of decentralized construction capacity to handle at least non-sophisticated and simple construction projects at the district and local level should be given priority attention in these decentralization programmes. The use of contractors operating from the district/local level would have advantages, including the following:

- (a) familiarity with local situation regarding labour, equipment and materials which should help in organization of construction works;
- (b) familiarity with, and accessibility to district/local authorities thereby facilitating decisions on implementation details including clarification of questions concerning design specifications, and supply of essential building materials distributed through official channels;
- (c) facilitation of communication channels between contractor's site management and the head office enhancing decision-making on matters affecting site operations.

67. Attention should be focused on small-scale contractors. In addition to improving their access to credit, they should be assisted in acquiring the necessary technical and managerial skills to run successful businesses. Training in how the construction process is organized, and in tendering procedures, preparation of claims, organization of site activities and labour, and in basic accounting skills will greatly improve their efficiency.

68. While it is clear that the development of construction capacity at the district/local level would promote better implementation of construction projects in rural areas, it is important to sustain these capacities by ensuring a reasonable market for projects which would enable the contractors to retain the services of their experienced skilled workers. This is crucial because contractors would be encouraged to locate in such areas only if they can be assured of the profitability of their operations, and one factor in this is the probability of securing contracts which might be better, depending on their expertise, if they are based in the urban areas.

Creation of technical capacity within district/local authorities

69. The centralization of technical expertise at the national and regional headquarters of government agencies responsible for the design and supervision of the construction of infrastructural facilities in rural areas sometimes leads to implementational bottlenecks. The creation or provision of technical expertise in areas relating to infrastructure and services within district/local authorities would not only facilitate the resolution of problems concerning interpretation of design details and specifications which may face contractors at works sites in rural locations, but would also have the following advantages:

- (a) better supervision of construction works which will minimize incidents of shoddy final output;
- (b) promotion of designs that are appropriate to the local situation in terms of availability and quality of contractors, labour, equipment and also building materials;
- (c) facilitation of regular measurement of work completed by the contractor and preparation of claims to ensure timely payments which would minimize the contractor's cash flow problems.

70. The shortage of qualified professional staff in many countries constitutes a bottleneck in fully implementing such a measure in the short-term but action should be initiated towards that end. Attempts have already been made in some countries in this direction. For example, in Ghana, the district office of Public Works Department is mandated to provide technical backstopping to the District Council.

Application of appropriate project designs

71. Project design greatly influences its implementation and affects the materials and techniques employed as well as the skills and expertise required. In a situation, as those prevailing in many rural areas in African countries, where the available labour is largely unskilled and imported materials are often in short supply, an appraisal of design concepts for infrastructural and services projects is required.

72. There should be a deliberate effort to design projects with emphasis on the utilization of locally available building materials and specifying the use of construction techniques which would permit the employment of a large labour force with generally low skills but without sacrificing the quality of the end product. This new emphasis in project design would not only help to improve the rate of project implementation but would also help in:

- (a) reducing project costs through the use of less expensive materials whose better supply would also reduce idle time at work sites caused by shortages in the supply of conventional building materials;
- (b) developing the capabilities of construction firms at the district/local level by providing opportunities for them to undertake projects based on simple construction techniques;

- (c) providing employment for local labour whose skills would be developed on the job to be applied to more difficult tasks on future projects;
- (d) building up a body of design concepts and principles which are responsive to the local technical, economic and labour situation, thus contributing to the attainment of self-reliance in the designing and implementation of construction projects, particularly in the rural areas.

73. Labour intensive techniques have successfully been used in the construction and maintenance of rural access roads in Kenya and the experiences gained have been employed by the ILO in similar projects carried out in other countries including Ethiopia, Botswana, Mozambique and Ghana.

Development of decentralized facilities for the supply of construction inputs
Plant and equipment

74. There is a general shortage of plant and equipment particularly for construction works requiring large quantities of earthworks. The problem is less acute for building works in rural areas for which the main equipment may be concrete mixers, vibrators, dumpers and tipper trucks.

75. In order to encourage contractors, especially those in the small-scale category, to undertake projects in the rural areas, it is important that governments consider alternative schemes to increase access to basic construction plant and equipment. In this connection, plant hire facilities have been established in some countries (for example Ghana, Kenya, Swaziland). Most of these facilities are operated from centralized locations without sub-national linkages to the regional or district level. Whilst there is keen competition for the limited plant and equipment available, there is also a tendency for preference to be given to contractors with projects in nearby locations in order to facilitate maintenance and repair services.

76. Even though the establishment of plant hire facilities require large foreign exchange expenditure African governments should give consideration to the pursuit of a systematic programme to create facilities and services at the sub-national level. The viability of such a scheme would however depend on the level of construction activity in the different regions of the country. In any case, a regionalized plant hire service based on a limited number of basic equipment such as graders, rollers, bulldozers, concrete mixers and vibrators would help greatly in promoting the implementation of construction projects in rural areas. More sophisticated or specialized equipment could be stocked only at centralized locations.

77. There are private entrepreneurs in some countries who operate plant hire services. In most cases, however, they need assistance to renew their stock of equipment and maintain a high level of serviceability. Many indigenous construction firms also need assistance to regularly maintain and repair their plant and equipment and to replace worn-out ones. This will not only help them to maintain good performance levels on projects, but would also increase their confidence to hire out idle plant and equipment.

78. Another scheme, which is already being implemented under World Bank financed labour-intensive rural road projects, is the inclusion of a component to supply basic equipment to selected indigenous contractors. The potential of this scheme should be exploited by African governments in negotiations for rural area projects funded from external sources.

Building materials

79. In many African countries essential building materials such as ordinary portland cement and steel are imported and therefore their supply is controlled by the availability of foreign exchange. In view of the shortfall in supply, distribution systems have been developed to ensure equitable distribution of what is available. Whilst it is difficult to ensure a fool-proof distribution system, an attempt should be made to accord priority to rural-based projects.

80. Increasing attention should also be focused on the establishment of local production units for alternative building materials like burnt bricks and tiles, lime and lime-pozzolana, and fibre-concrete roofing tiles which could be used in the construction of buildings, small bridges and in lining irrigation canals. Appropriate technologies which are simple, low-cost and labour intensive are now available for the production of these materials and African governments should encourage their decentralized development based on the raw materials situation in different parts of the country.

81. The fibre-concrete technology which is now very well developed in some countries, for example, Kenya, Malawi, Tanzania and Uganda, has great potential for minimizing the roofing problem in rural areas. In Malawi, sisal fibre-reinforced cement roofing sheets and tiles have successfully been used in a nationwide rural housing project. Since 1981, when the project started, over 30,000 square metres of the sheets (1000x760x9mm) have been produced to roof the houses of beneficiaries. The project started developing the tiles (600x280x7mm) in 1984 and these have been promoted since then as an alternative to the sheets. The Nigerian Building and Road Research Institute in Lagos has also developed fibre concrete roofing sheets using coir fibre. The technology has been adopted by the national Directorate of Food, Roads and Rural Infrastructures in its rural housing improvement programme.

82. The production of a low-cost cementitious material from lime and pozzolana (natural pozzolana, calcined clay, calcined bauxite waste, rice husk ash, bagasse ash, etc.) could be developed in many African countries. Lime-pozzolana mixes can be used as a replacement for ordinary portland cement in some construction applications like making building mortars, blocks and plasters. Up to about 30 per cent of portland cement could be substituted in mass concrete with a pozzolana of a suitable quality without affecting the final strength. 18/

Promotion of interaction between contractors' associations and concerned government ministries and institutions

83. The performance of contractors in the construction industry in African countries, as in other developing countries, is affected by two main sets of factors: those related to deficiencies in their own organization and operations; and those related to other actors in the sector and which are normally outside

their control, for example, shortage of construction inputs, inadequate credit, delays in payments for completed works, etc. Governments, being the major clients in the construction sector in African countries, have a responsibility to create favourable conditions to ensure the achievement of high performance levels by construction firms. This is in the interest of governments since better returns would then be achieved for investments in buildings and civil works.

84. Conversely, contractors owe it as a duty to themselves to exercise concern about matters affecting them and to take such measures as would promote the practice of their trade. It is to this end that contractors' associations should be formed, and indeed have been formed in some countries, as a means of providing members with a forum to discuss their mutual problems, and to represent them in negotiations with the government, which is their major client.

85. Each of the three major actors involved in the construction process - the client, the consultant and the contractor have their own objectives which sometimes may appear conflicting. However, an efficient contractual system would help to optimize output and minimize costs whilst ensuring that each party in the process perceives that his objectives are, at least, partially realized. This calls for continuing dialogue among the parties to resolve problems facing the construction industry as a whole.

36. Thus the peculiar problems related to the design and organization of construction for the provision of infrastructures and service facilities needed to support development activities in the rural areas would be addressed to evolve workable solutions in the context of limited resources. Contractors have a special role in maintaining the dialogue especially with the government because it has to deal with allocation of scarce financial resources to a number of competing sectoral demands most of which are accorded high priority in national development plans. The dialogue should also assist in rationalizing the organization of the construction sector to ensure efficiency and improved returns on investments.

V. THE RESPONSIBILITIES OF AFRICAN GOVERNMENTS, REGIONAL AND INTERNATIONAL ORGANIZATIONS

Responsibilities of African Governments

87. The majority of governments in Africa are increasingly being confronted by economic problems which place limitations on the financial resources they can make available for national development projects, particularly for the provision of infrastructures and services to support development in the rural areas. The government is a principal actor in the creation of roads, irrigation canals, water supply systems, etc. in the rural areas by the construction sector. It therefore has an important role to play in ensuring that the sector operates efficiently.

88. The following measures are suggested for the attention of governments of member States:

- (i) Encourage the development of designs and application of construction techniques that are geared to economy in the consumption of scarce (imported) building materials and promotion of the use of locally available materials, as well as construction skills;
- (ii) Promote the development and increased production of local building materials within the framework of a decentralized system based on locally available resources in rural areas and appropriate production technologies;
- (iii) Create or strengthen existing technical capacities within district/local level authorities to facilitate the design and implementation of infrastructure projects in rural areas;
- (iv) Review procedures for contract administration, with special reference to projects in rural areas, with a view to minimizing bottlenecks which, among others, result in delayed payments to contractors;
- (v) Encourage the development of construction capacities at the district level through the provision of financial assistance, provision of training in technical, administrative and management skills, and exercising preference in the award of local contracts;
- (vi) Encourage the formation of co-operatives of local craftsmen and artisans and assist them in securing sub-contracts or contracts for simple infrastructural and services projects in the rural areas;
- (vii) Provide incentives, including preferential allocation of scarce building materials, to contractors who opt for projects in the rural areas;
- (viii) Encourage research on the development of innovative building materials, and construction systems and techniques suitable for application in rural areas.

Responsibilities of regional and international organizations

89. Regional and international organizations also have a role to play in assisting African countries to overcome bottlenecks in the design and implementation of construction projects that are planned to enhance economic and social development in rural areas. Their resources, including finance and experiences gained in some African countries as well as in other developing countries, must be utilized to support the efforts being made by the governments of African countries.

90. Specifically, their assistance in the following areas would have beneficial results:

- (i) Encourage the adoption of appropriate building materials and techniques in the design and construction of projects for which external funding is provided, giving due consideration to the need to maximize the use of local resources including labour;

- (ii) Support research on the development of innovative building materials based on locally available resources and techniques for their application in rural infrastructural projects;
- (iii) Assist in providing training in the production of building materials using appropriate technologies, and in developing the capacities of small-scale construction enterprises based at the district level to ensure their greater participation in project implementation in rural areas;
- (iv) Assist in the development of design standards and specifications as well as codes of practice that are relevant to the social, technical and economic situation in African countries.
- (v) Assist governments in reviewing the organization of the construction industry with a view to improving efficiency and enhancing project planning and implementation;
- (vi) Promote information exchange on various aspects of the construction industry among African countries and also between them and countries outside the African region.

REFERENCES

1/ For example, Technical publication on Approaches to the Formulation of Comprehensive Construction Planning and Implementation Policies in Africa. E/ECA/HUS/28, December 1987.

2/ FAO Report of the World Conference on Agrarian Reform and Rural Development, WCARRD/REP. July 1979.

3/ FAO Report of the World Conference on Agrarian Reform and Rural Development, WCARRD/REP., July 1979.

4/ J. Howe and P. Richards: Rural Roads and Poverty Alleviation, I.T. Publications, 1984.

5/ Anderson G.V. - Effectiveness and Impact of the CARE/Sierra Leone Rural Penetration Roads Project, AID Project Impact Evaluation Report No. 7, 1980.

6/ Trends in Road Use in Kenya, Ministry of Transport and Communications, July 1981.

7/ International Drinking Water and Sanitation Decade: Regional External Support Consultation, 25-28 November 1985, Cote d'Ivoire, Paper entitled: Africa-regional Resource Mobilization Profile.

8/ UNCHS (Habitat): Infrastructure Provision in Shelter Programmes. Background paper for East African Sub-regional Meeting on IYSH, 1986.

9/ Report on the Rural Health Survey, 1982/83, Vol. 2, Central Statistical Office, Bulletin No. 52, Ethiopia.

10/ D.C. Okpala: Human Settlements in Africa's Development, Rural Progress Vol. VI, No. 2, 1987, ECA, Addis Ababa.

11/ E.O. Lufadeju: The Role of Shelter in Economic Development in Africa, African Urban Quarterly, Vol. 2 No. 3, August 1987.

12/ Judith Tendler-Rural Projects Through Urban Eyes. World Bank Staff Working Papers, No. 532, 1982.

13/ G. Edmonds (ILO): Labour-based Construction Comes of Age. Appropriate Technology, Vol. 10, No. 1, June 1983.

14/ Ibid.

15/ ILO: Pre-investment Study for the Development of Small-scale Construction Enterprises in Tanzania, 1983.

16/ Kiaratu, A: The Role of BHESCO in Importation and Distribution of Building Materials. Paper presented at National Construction Council Building Materials Seminar, 27-29 April 1982, Arusha, Tanzania.

17/ ILO: Pre-investment Study for the Development of Small-scale Construction Enterprises in Tanzania, 1983.

18/ State of the Art of Local Building Materials in Africa, E/ECA/HUS/31, April 1986.